Electricity Sector Energy Intensity Trends

A New Industry Undergoing Dramatic Changes

Presented to

e-vision 2002: Shaping our Energy Future by Reducing Energy Intensity in the U.S. Economy

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Why the Electricity Sector is Different

- Generation fuels can be counted in two ways
  - End-use electricity and electricity losses can be allocated to delivered energy sector (e.g., residential)
  - Electricity losses can be included separately in primary energy
- Sector transforms heat into mechanical energy to turn generators
- Structural shift and component intensity must be defined differently than in other sectors
- Final electricity product will be refined substantially over the next few decades
  - When: peak, shoulder, or baseload
  - Where: location, location, location
  - Quality: paying for reliability

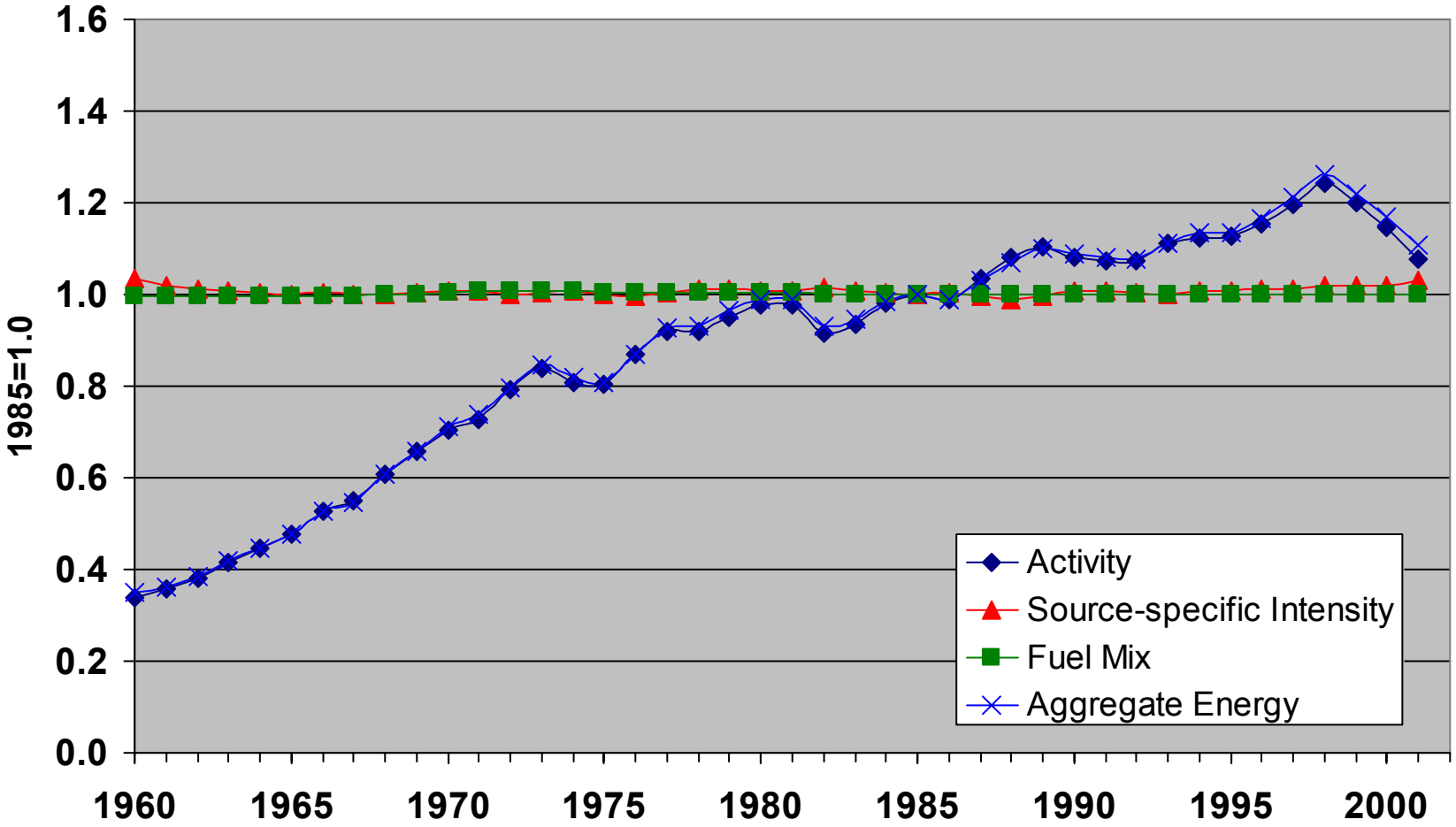
What Can We Measure?

- Compositional changes in electricity's value will be difficult to measure with readily available data
- However, these changes should have important effects on generation sources for producing electric power
  - Baseload use will favor combined cycle gas and coal units
  - Peak use will favor gas turbines
  - Efficient transmission pricing may favor distributed generation and renewables under certain conditions
  - Integration of regional markets will encourage more electricity trade and more production in lower cost regions
- Structural shift will be defined as changes in the sector's generation mix
- Component energy intensity will be defined as efficiency changes for a particular generation source

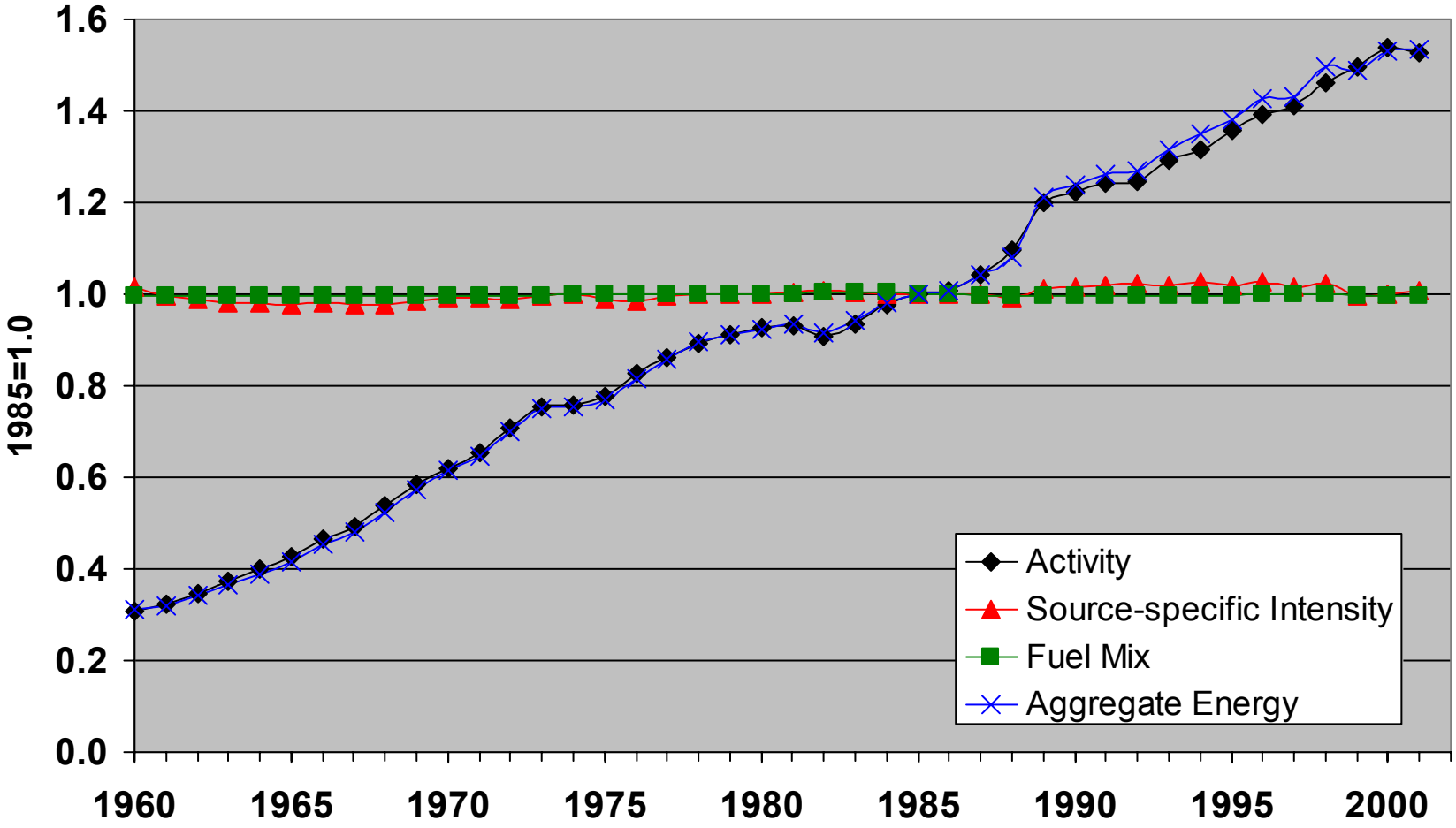
What Does EIA Measure Today?

- EIA is revising its reporting of nonutility data for energy use
  - to produce electricity
  - to produce useful thermal output
- Current EIA data allow intensities (=consumption/ generation) to be computed for
  - fossil fuel portion of electric utility sector
  - total electric power sector, 1949-2001
  - non-utility sector, 1989-2001
- Intensities based upon these data reveal a near-constant trend over the full period.

Fossil Fuel Generation in Electric Utilities: Activity, Intensity and Structural Change



Total Generation in the Electric Power Sector: Activity, Intensity and Structural Change



Total Electricity for Non-Utility Power Producers: Activity, Intensity and Structural Change